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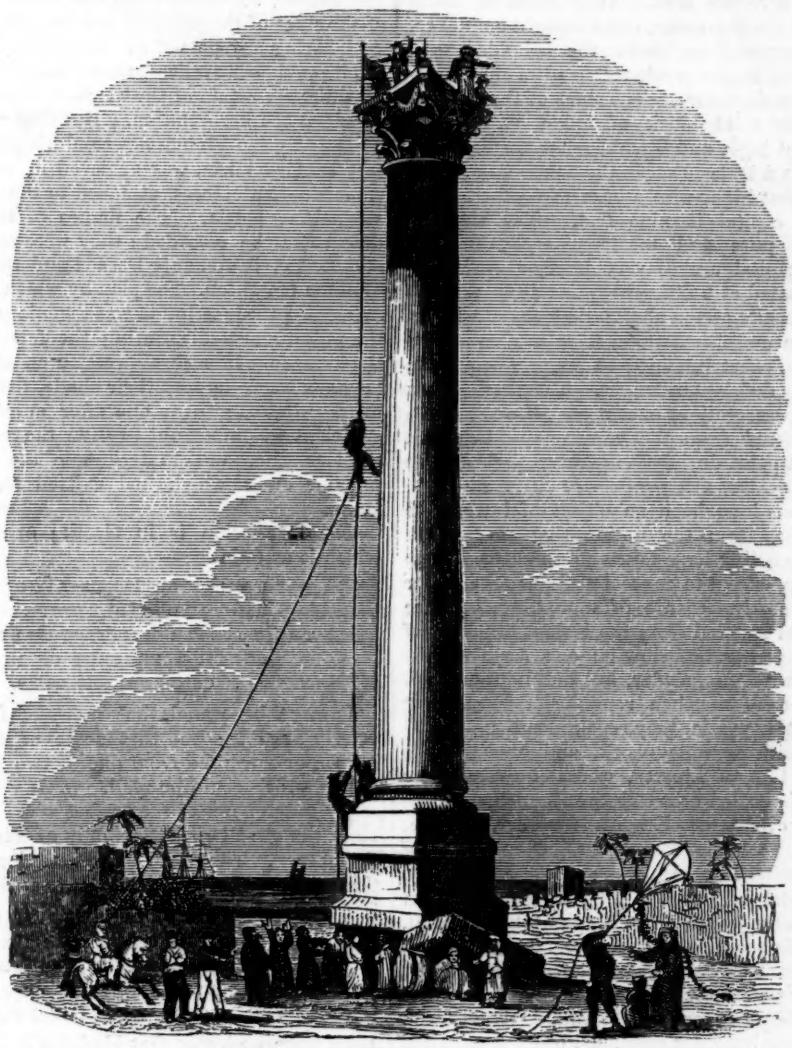
POMPEY'S PILLAR AND CLEOPATRA'S NEEDLE.



POMPEY'S PILLAR.

Among the wonderful monuments which are so largely dispersed over that wonderful land of mystery and sublimity, Egypt, is a colossal pillar which has received the name of Pompey, the great Roman general, and rival of Julius Cæsar; and has in our own time excited the attention of the historian, the antiquary, and the traveller, to such an extent that, after several centuries of error and confusion, our information respecting the real origin of this work of art is clear and decisive.

In the fifteenth century, when learning was beginning to revive, human knowledge was chiefly confined to the architectural and literary remains of the ancients: they were the guides which served to recover mankind from that state of mental weakness and degradation which followed the overthrow of the Roman empire: then it was that the remains of the ancients became sacred, their buildings preserved, and their books sought for and perused with alacrity; the latter often serving as the interpreters of the former, whereby the manners, customs, and intelligence of the ancients became known, and to a certain extent served as a model and a guide to a community whose intellectual strength was infantine.

In this way it was ascertained that a monument had been erected to Pompey in or near Alexandria, the capital of Lower Egypt. It was therefore naturally supposed that the Pillar represented above was the monument in question. In the absence of all knowledge derived from inspection of the pillar itself, the name *Pompey's Pillar* was attached to it; and thus almost undisputed was it handed down century after century, until the occupation of Egypt by the armies of France and England, about forty years ago.

Before this time one or two travellers had converted it into a trophy erected to the memory of Septimius Severus. This pillar was said to be the remnant of an ancient city, which it once adorned: another account says that it was placed upon the ruins of the city of the Ptolemies; but in the time of Septimius Severus this city was not in a ruined state.

Before we proceed to notice the real object of the erection of the pillar, let us say a few words descriptive of the pillar itself, of which our engraving will convey a very accurate idea. It is situated about two miles from the sea-shore, upon a slight eminence, and its vast proportions strike the beholder with amazement. Its height is 88½ feet, and of the Corinthian order of architecture. The shaft of the column consists of one solid block of red granite finely polished, 64 feet high, and 8 feet 4 inches in diameter. This shaft leans a little towards the south-west. The pedestal is 10 feet high, with a base of 5½ feet. The height of the capital is nine feet. The shaft is executed in a pure and masterly style, but the pedestal and capital are of very inferior workmanship, and executed at a different time: they are not of the same granite as the shaft: they are clumsy in style, and in an unfinished state, so as to give an outline only of the effect intended to be produced: the pedestal, too, is deficient in height. The shaft is in a good state of preservation, except on the north-west, which has suffered from the constant winds which blow from that point during the greater part of the year.

This pillar has long been an object of interest to the rude Arabs, from the notion that no human beings could possibly have taken so much trouble to erect such a pile, except to conceal and preserve under it a large and costly treasure of some kind. Hence the pedestal has suffered from the violent attempts of the Arabs to penetrate below it: one Arab sought to blow it up with gunpowder, but did not succeed. When the forces of the then republic of France got possession of Alexandria, they repaired and supported the pedestal with masonry-work, and crowned the capital with a Cap of Liberty, which, however, was soon afterwards pulled down by the English.

When the celebrated English traveller, Clarke, visited Egypt, he made Pompey's pillar an object of particular examination. He was surprised to observe that the pedestal did not rest upon the sand; for on digging this away, so as to get beneath the pedestal, he found, to his surprise, that the whole of this immense pile, consisting of three parts, pedestal, shaft, and capital, was sustained upon a small prop of stone, about four feet square. Around this central base, but in very irregular positions, other masses had been placed, consisting of the sepulchral fragments of ancient Egyptian monuments, which did not appear to contribute to the support of the column, but to have been brought there for the purpose of maintaining the prop in its adjusted situation, until the pedestal could be raised upon it. The four sides of the prop are inscribed with Egyptian hieroglyphic figures, but the position of these shows that the prop has its original base uppermost, for they appear inverted; thus affording complete proof that the stone whereon they are inscribed belonged to other more ancient works, and that they must have been ruins before the column was erected upon its present basis; and consequently that the work is of comparatively modern construction.

A similar conclusion had already been made by Denon, shortly before Clarke's arrival in Alexandria. He concludes that the foundation being made of ruins announces a modern construction: also that the erection of this monument may equally belong to the time of the Greek emperors or to that of the caliphs.

The latter part of Denon's conclusion affords a curious instance of a practice which he himself condemns; viz., that of drawing conclusions from insufficient data. A numerous body of men, renowned for their science and learning, accompanied the French army into Egypt, with the especial object of examining and collecting Egyptian antiquities. Pompey's Pillar was an object of careful and repeated examination; and although an inscription was known to exist on one of the sides of the pedestal, yet they did not succeed in deciphering any part of it. They agreed in the reports of all previous travellers, that it was too much defaced by time, the action of the weather, and wanton injury, to admit of interpretation. But that which could not be done by the French *savans*, during their protracted stay at Alexandria, was achieved in a few weeks by some English officers, attached to the English garrison at Alexandria. The names of these gentlemen deserve to be recorded: they were captains Dundas and Leake, lieutenants Desade and Squire, and Mr. William Hamilton. The plan by which they succeeded in reading the inscription was ingenious. By watching the pillar repeatedly during the few moments when the sun shone in such a direction on the pedestal, as to mark the letters by their shade, they were enabled to discriminate them one after another; and thus sufficient was made out to show the real origin of this massive pile, and to terminate the existence of a popular error which had existed for five hundred years.

The inscription is in Greek; one translation of which is as follows:—

TO DIOCLETIANUS AUGUSTUS,
MOST ADORABLE EMPEROR,
THE TUTELAR DEITY OF ALEXANDRIA,
PONTIUS, PREFECT OF EGYPT,
CONSECRATES THIS.

It must be stated, that many of the letters were utterly illegible: but that some of the words were known or surmised from one or two or more of the letters which could be read. This remark does not apply to the name of the prefect who erected the work, since the first two letters only of his name can be deciphered. Thus Dr. Clarke's version of the inscription is somewhat different. It is as follows:—

POSTHUMUS, PRÆFECT OF EGYPT,
AND THE PEOPLE OF THE METROPOLIS,
[*honour*] TO THE MOST REVERED EMPEROR,
THE PROTECTING DIVINITY OF ALEXANDRIA,
THE DIVINE HADRIAN AUGUSTUS.

Now since we know that Hadrian lived from the year of our Lord 76 to 130, it is quite clear that Pompey has no connexion with this pillar; and that it ought no longer to bear his name.

We have stated above that the French, when they saw the dilapidated state of the monument, immediately set about repairing it. It affords a curious illustration of the difference, as respects the cultivation of taste for works of art and monuments of antiquity, between the French and the English. When the latter got possession of Alexandria, the visitants to this noble pile amused themselves with chipping off large pieces of granite from the pedestal, in order to carry them home as curiosities to their friends in Europe. This abuse so greatly prevailed, that a sentinel was finally placed on the spot, as the only means of preserving the pedestal from utter ruin. In 1830, Mr. Webster, in visiting Alexandria, anxiously proceeded to Pompey's Pillar, to read the far-famed inscription, on the west side of the pedestal. He

found indeed an inscription which required no peculiar obliquity of the solar rays, to enable him to decipher. The inscription read by him was in gigantic letters of black pitch, as follows:—

HENRY CRAM,
NEWCASTLE-UPON-TYNE,
H.M.S. GLASGOW, MARCH, 1827.

While Johnsons, Thompsons, and eternal Smiths, were innumerable: the "writing materials," (which we have neglected to describe in our series on this subject, published in the Saturday Magazine) were black paint, red-ochre, pitch, and sand.

The engraving which illustrates this article represents the means employed by some English sailors to arrive at the summit of this pile. By means of a kite, a strong cord was passed over the top of the column, and securely fastened on one side, while one man climbed up the other. When he had reached the top, he made the rope still more secure, and others ascended, carrying with them water of the Thames, of the Nile, and of one of the Grecian Islands: a due supply of spirits was also provided, and thus a bowl of punch was concocted; and the healths of king George the Third, and other distinguished persons, were drunk. This ascent was made when the British fleet was in Egypt, since which time the ascents have been numerous; for, according to Mr. Webster, the crew of almost every man-of-war which has been stationed in the port of Alexandria has thought the national honour of British tars greatly concerned in ascending the height of fame, or, in other words, the famous height, which Pompey's pillar affords. It is not unusual for a party to take breakfast, write letters, and transact other matters of business on this very summit; and it is on record that a lady once had courage to join one of these high parties.

In the neighbourhood of Alexandria there exist two ancient monuments called *Cleopatra's Needles*. This fanciful name has been given to two obelisks of red granite, one of which is erect, and the other prostrate. According to a survey of the latter, made by Clarke, the base measures seven feet square, and the length is sixty-six feet. They are covered with hieroglyphics cut into the stone to the depth of two inches. The granite was observed to be in a decaying state.

After the English were in possession of Alexandria, a subscription was opened by the military and naval officers for the purpose of removing the prostrate obelisk to England. With the money so raised they purchased one of the vessels sunk by the French in the old port of Alexandria: this was raised, and prepared for the reception of the obelisk. The French had already cleared away the heaps of rubbish which enveloped it, and the English turned it round, and found it in a fine state of preservation. It was moved towards the vessel, when an order arrived from the Admiralty, prohibiting the sailors from being employed at this work.

No further attempts have been made to remove this fine monument to Europe. A few years ago the French removed a fine granite column, of the same character as Cleopatra's Needles, from the interior of Egypt to Paris, and it now serves to adorn that flourishing capital. It is called the Obelisk of Luxor.

The two needles of Cleopatra, as they are so questionably called, served to decorate one of the entrances to the palace of the Ptolemies, the ruins of which are contiguous.

ENGLAND IN THE OLDEN TIME.

I.

UNDER the general title of "England in the Olden Time," we propose to present to our readers, occasionally, accounts of many of the ceremonies, customs, and pastimes of our forefathers, some of which remain in use to the present day, while others have become obsolete, and are only known to us from accounts preserved in ancient manuscripts, or in some of the earliest printed books.

While we are ready to grant that the future advancement of the human race in all that is good and valuable, is and ought to be one of the highest objects of our attention, we ought also to be ready to admit that the usages of by-gone ages afford us valuable tests by which to judge of the state of mind at those times; and by comparing those times with the present, to determine how far we have advanced in mental and moral power, and to what extent we are justified in looking forward to further improvements. If these remarks be just, we have to decide what are the best tests of the manners and customs, or rather the state of mind, among a people. Our historians tell us of the wars of kings and princes, too frequently carried on for their own personal ambition and aggrandizement;—our biographers detail to us the actions and the thoughts of men who have rendered themselves objects of note, either for good or evil:—our geographical and topographical writers tell us what was the nature of any particular part of the country, whether favourable for hunting, for shooting, for antiquarian research, &c. But something more than all this is necessary: the mass of the people, and not distinguished individuals, give the tone to popular customs. Mr. Strutt observes,—

> In order to form a just estimation of the character of any particular people, it is absolutely necessary to investigate the sports and pastimes most generally prevalent among them. War, policy, and other contingent circumstances, may effectually place men, at different times, in different points of view; but when we follow them into their retirements, where no disguise is necessary, we are most likely to see them in their true state, and may best judge of their natural disposition.

In fulfilment, therefore, of the plan as above announced, we proceed to notice a curious and once favourite game called

QUINTAIN.

IN the age of chivalry, when Europe swarmed with armed knights, ready to be engaged in almost any encounter, good or bad, it is obvious that there must have been times when business of importance did not require their attention, and when they were at liberty to engage in such recreative exercises as might suit their character and tone of mind. The *tournament*, in its various forms and modifications, was the most prominent of these, and one branch or division of the tournament was that class of exercises called *quintain*, after the name of the inventor.

The principle of this exercise consisted in running or riding swiftly up to a stationary object, and striking it with a lance or some other weapon at the moment of passing it, the blow being given with especial attention to the attainment of some particular object. The original object was, to habituate youthful knights to the steady and accurate use of the lance during a combat, and while on horseback. The quintain, or object at which to strike, was originally nothing more than a trunk of a tree, or a post. Afterwards this was replaced by an imitation of the human head and body, carved in wood, and turning upon a pivot. The figure held a shield in its left arm, and bran-

dished a wooden sabre in the right. In running at this figure it was necessary for the horseman to direct his lance with great adroitness, and strike upon the forehead between the eyes, or upon the nose; for if he struck wide of those parts, especially upon the shield, the quintain turned about with much velocity, and, in case he was not exceedingly careful, would give him a severe blow on the back with the wooden sabre held in the right hand: this was considered highly disgraceful to the performer, while it excited the laughter and ridicule of the spectators. In point of importance, a blow between the eyes was reckoned best,—on the nose, second best,—and under the nose third in excellence.

This exercise was not confined to horsemen, but was also conducted on foot. A *post-quintain*, or a firmly-fixed pillar, was the object of attack. The practitioner assailed this post, armed with sword and shield, aiming his blows as if at the head, the face, the arms, the legs, or the sides, of his supposed antagonist: taking care at the same time to keep himself so completely covered with his shield, as not to give any advantage, supposing he had a real enemy to cope with.

It was one of the laws of chivalry, that no one under the rank of an esquire could engage in the justs and tournaments of which we read so much in early writers. It followed from this, that if the people generally wished to engage in such exercises, they had to establish a particular class of them for themselves. This was the case in England. Many rude varieties of quintains were employed in the thirteenth and two following centuries. The quintain was frequently nothing better than a stake fixed into the ground, with a flat piece of board made fast to the upper part of it, as a substitute for a shield; and such as could not procure horses, contented themselves with running on foot to the quintain. Youthful aspirants to chivalric fame, sometimes manufactured a wooden horse on four wheels: one boy sat on the horse, and two others drew him along towards the quintain, at which he struck with a pole, or any other implement, which he could persuade himself bore a resemblance to a lance. This sport is represented in the accompanying figure.

Dr. Plott, in his *History of Oxfordshire*, describes the quintain of the peasantry, as used in his time.

They first set a post perpendicularly into the ground, and then place a slender piece of timber on the top of it, on a spindle, with a board nailed to it on one end, and a bag of sand hanging at the other. I saw it at Deddington in this county. Against this board they strike with strong staves, which violently bringing about the bag of sand, if they make not good speed away, it strikes them in the neck or shoulders, and sometimes knocks them off their horses:—the great design of this sport being to try the agility both of horse and man, and to break the board. It is now only in request at marriages, and set up in the way for young men to ride at as they carry home the bride; he that breaks the board being counted the best man.

Stow describes the prevalence of the same pastime at a spot which a modern Londoner would be little disposed to expect.

This exercise of running at the quintain, was practised in London, as well in the Summer as in the Winter; but especially at the feast of Christmas, I have seen a quintain set upon Cornhill, by Leadenhall, where the attendants of the lords of merry disports have run and made great pastime; for he that hit not the board end of the quintain was laughed to scorn, and he that hit it full, if he rode not the faster, had a sound blow upon his neck with a bag full of sand hanged on the other end.

Another variety of this sport was the *water-quintain*, usually practised by young Londoners upon the water during the Easter holidays. A pole or mast was fixed in the midst of the Thames, with a shield firmly attached to it. A boat, which was placed at some distance, was driven swiftly towards it by the combined force of tide and of oars; and a young man who stood at the prow struck against the shield with a lance, as the boat passed onward. If he were dexterous enough to break the lance against the shield, and retain his place, the intended object was answered; but if he failed in so doing, he was almost inevitably precipitated into the water, and the boat went on without him; two other boats were, however, at hand, to render him assistance, and pick him up. The bridge, (for there was then no other bridge than London Bridge over the Thames,) wharfs, and houses near the river, were crowded with spectators, to witness these exhibitions.

When Leicester entertained Queen Elizabeth at Kenilworth, among the other entertainments was a representation of a country bridal.

In the castle, (says Laneham,) was set up a comely quintane for feats at armes, where, in a great company of young men and lasses, the bridegroom had the first course at the quintane, and broke his spear "très hardiment" (very boldly, or with much courage). But his mare in his manage did a little stumble, that much adoe had his manhood to sit in his saddle. But after the bridegroom had made his course, ran the rest of the band, awhile in some order, but soon after tag and rag, cut and long tail; where the speciality of the sport was to see how some for his slackness had a good bob with the bag, and some for his haste to topple downright, and come tumbling to the post: some striving so much at the first setting out, that it seemed a question between man and beast, whether the race should be performed on horseback or on foot; and some put forth with spurs, would run his race byas among the thickest of the throng, that down they came together hand over head. Another while he directed his course to the quintane, his judgment would carry him to a mare among the people; another would run and miss the quintane with his staff, and hit the board with his head.

Another quintain, used as a juvenile sport, was a tub full of water balanced on a post or pillar; and the trial of skill consisted in striking this with a lance or pole in such a manner that the water, when the tub was upset, should not drench the spearsman.

Military men in the middle ages sometimes practised at a man completely armed, whose business it was to act upon the defensive, and parry their blows with his shield. An observation made by one knight to another on this subject has been preserved:—

I do not by any means esteem you sufficiently valiant for me to take a lance and just with you; therefore I desire you to retire to some distance from me, and then run at me with all your force, and I will be your quintain.

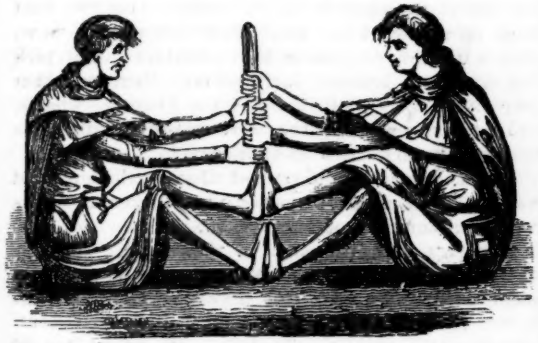
Sometimes a man, representing a living quintain, was seated upon a stool with three legs without any support behind, and the business of the tilter was to

overthrow him; while, on his part, he was to turn the stroke of the pole or lance on one side with his shield, which, if adroitly accomplished, seldom failed to precipitate his antagonist to the ground.

Another kind of quintain exercise was practised without any lance or shield, the feet serving both offices. One man, seated on a stool, held up one leg horizontally:—another man stood opposite to him, and with his uplifted foot endeavoured to thrust the sitter off his stool, which the latter, of course, endeavoured to prevent:—the soles of the opposing feet, it will be understood, came in contact.

In another form of the sport, the sitter holds up his leg, as in the last instance; but his opponent is seated in a swing, and being drawn back by a third person, the velocity with which he swings forward is made a moving power by which to knock the sitter off his stool; if this fails, the swinger is very liable to be thrown backward out of his swing.

The last variety which we shall give, and which can justly come under the name of quintain, is represented in the annexed cut. Two persons sit upon the ground, place the soles of their feet in contact, and grasp hold of a stick common to both of them. The contest consists in endeavouring to overturn the antagonist by main pulling force.



Tilting, or running at the ring, differed but little from quintain. A ring, suspended from a kind of gibbet, hung so as to be on a level with the eyebrow of a horseman. He rode under it at full speed, stooping his head as he passed, and aimed at thrusting his lance into the ring, and bearing it off as a trophy of his success.

We must reserve justs and tournaments for a separate article.

VORACIOUSNESS OF THE EEL.

While one day standing on a low ledge of rock, enjoying the delightful scenery of the Tay, I witnessed a very striking, and, so far as I know, novel exhibition, touching natural history, being nothing less than a chase upon terra firma of a crab by an eel, and illustrative in a remarkable manner of the eagerness with which the latter animal pursues its prey. My attention was first drawn to the spot by a rustling sound, where I saw the fugitive in the act of emerging from the water. The eel, of large dimensions, soon followed. After promptly effecting a landing on the rock on which I was standing, which both of them did with great dexterity, the crab took to his heels with all manner of despatch, and soon showed his pursuer the advantage of the possession of a supply of limbs. The eel, however, nothing daunted, although labouring under the primeval curse of the serpent, dashed after him with the utmost eagerness; but it was soon obvious that the locomotive machinery of the latter was dismally at fault. He wormed, twisted, and oscillated himself to and fro to comparatively little purpose, although in this way he kept up the chase for a considerable distance, until at length, on my approach, both of them made a short cut, and got again into the water.— ?

FRUITS DESIGNED TO BE A SOURCE OF ENJOYMENT TO MAN.

The fruits constitute a very peculiar set of productions, united by a common bond; in a certain sense, superfluous to us, and sources of pleasure. Many of them may be viewed as originally designed for food alone; but we need not here consider them in this light, nor point out their salutary, medicinal, or other useful qualities; since the present inquiry is limited to superfluities, or pure sources of pleasure. Yet there are two general facts relating to fruits which must not be passed over; because they must be regarded as special efforts of beneficence, whether the results belong to food, health, or pleasure.

The most remarkable of these is the succession in which they have been destined to appear, and it will be most striking to him who shall consider it as a philosophical botanist. It is opposed to the inferences which science would have made before experience; while, being known, it defies all explanation. Like so much more, we must view it as an arbitrary law, or as the will of God; acting, by whatever means it does act, for the good of His creatures.

Of many fruits at least, the nature is necessarily transitory. They are always connected in some manner with the seeds, which must often be dispersed as soon as they arrive at maturity, that the plant may be perpetuated. Or they are particular portions of the whole fructification, which must, from its very nature, have soon perished: while, in other cases, they could not but partake of the temporary duration of the whole vegetable; or are such that their value and uses depend on a constitution, both organic and chemical, which is of necessity perishable. What then would have happened, had all plants produced their fruits at the same period; as we might have expected, knowing that heat is the cause of their production and their ripening? They could not have been consumed: we should have been overwhelmed with them for one short period; and, through the rest of the year, we should have wanted. And accordingly, where this arrangement is more purely conducive to pleasure, they have been commanded to appear in succession, so that as one vanishes, another is ready to supply its place. We profit by this even in our own short summer: it is more extensively the fact in tropical climates, where these productions are far more numerous, and their uses, both to man and animals, much greater. And if, in our limited summers, these fruits must be equally limited, so is it contrived that the want, the necessity, or the utility, and almost the enjoyment, should keep pace with the means. Under our artificial habits this cannot be rigidly exact; but the general truth is sufficiently familiar.

The other fact alluded to, conduces to the same good ends. All fruits are not transitory or perishable, so as to demand immediate consumption. On the contrary we find in them the greatest variety; from an immediate urgency to be used as soon as they are perfect, to a power of delay which enables us to preserve them through an entire year, till a new summer comes, to recommence the same round. And so admirably have the provisions for this been appointed, that many will not ripen on the parent tree: a fact which, familiar as it is, offers no small difficulty, both in vegetable and ordinary chemistry. Did the organic chemistry not continue to act, the fruit would rot, since this is the invariable result of that agent when life has left those organizations. The stored apple is not less alive than its seeds: its principle of vitality remains, one of those inexplicable detachments, like the slip, from the general life, and it con-

tinues to act on the fluids which the vessels contain, through those vital powers which equally directed the organic chemistry before. Thus does it convert the malic acid into sugar, and thus many other similar conversions are effected; not one of which, extra-organic, or common chemistry, has yet been able to perform.

In this and other modes, have provisions been thus made for preserving fruits and continuing their useful succession; while the most universal of these is a constitution which renders them naturally durable; often, without any effort of our own; and, at other times, under some assistance from art. And this provision, like the former, extends its influence very widely. The constitution of the globe did not allow of an equal climate or summer to all the world, though man is permitted to dwell everywhere. Commerce, equalizing in a great measure this necessarily partial distribution, causes the inconvenience to be little felt. In the latter case, where the constitution of the fruit is naturally durable, as in the date, for example, there is nothing to excite peculiar notice, more than in other instances of analogous commerce. But there is a contrivance in some of the perishable or truly summer fruits of the hot climates, which must not be passed over: enabling them not only to be preserved, but transported far and wide; adding to the wealth of those who produce, and to the enjoyment of those who consume, as they also add to the wealth even of the latter, by stimulating labour. The lemon and the orange ripen, like the apple, at a distant time, without the aid of the parent tree, or the parent climate; without light, and without heat: giving us, in the regions of snow, all that we could have derived from a tropical sun. An object so familiar is, as usual, little considered: but, independently of this power of delay, of the extraordinary conversion of citric acid into sugar, in this little and strange laboratory, and of an investment which, appointed for the defence of the interior, is moreover so contrived that it shall furnish the greatest resistance when that was most needed, he who is still ignorant must be taught to admire the beautiful mechanism, elsewhere pointed out, through which the enclosed fluid is preserved, under a great chemical difficulty. Had the exterior structure included a fluid only, as the cocoa-nut does, and as, to all of its immediately useful purposes, it might have done, this must have fallen into fermentation, as chemistry well knows. Yet that has been guarded against, and in the exact manner in which this science would have suggested. Each compartment is so small, that fermentation cannot take place: while it is not unlikely that this very law, so unexpected under our general knowledge of this process, was appointed for such and similar ends. Nor was this structure necessary, as regards either the vegetable or the produce. The fluid might have been secreted as that of the cocoa-nut is; it would have been equally useful to those who possessed the tree, but its wider uses would have been unattainable.

I may turn to the further provision for preservation and transportation which has been made through drying; most often, but not necessarily, demanding the assistance of art. Thus do the fig, and the date, and the grape, almost preserve themselves; as many others require but little aid from our own industry, while the means are thus pointed out to us by nature. If Arabia would be uninhabited without the camel, so might it but for the date: while the properties of both equally are such as man would have given, had he possessed the power with the inventive faculty. But the fundamental provision for this is laid in that of sugar: a substance deserving peculiar notice, not only as an article of food, or a source of enjoyment more universally allotted to animals, than any other of the productions affecting the sense of taste, but because of its remarkable chemical properties, directed, we can scarcely doubt, essentially to the ends here under review. Incapable of change itself, it preserves not merely the vegetable, but even the animal organizations, from chemical destruction: and thence also, where nature has not added it to the fruits in sufficient quantity, is art enabled to supply it with the same useful results, in modes which are as familiar as they are numerous.

To return now to the consideration of the fruits themselves, it is necessary first to remark, that although appendages to the seeds, in some manner, they are not essential to those, or to the perpetuation of the plant. And being superfluities, we must conclude that they were superadded for an extraneous purpose, indicated with sufficient clearness by the uses or pleasures which they afford to us. Had this superfluity, however, always been of the same nature, or had every fruit constituted the same portion of fructification, we might still have imagined some necessity as to the plant itself, or attributed the whole to some needful vegetable arrangement. The present variety is hostile to such a conclusion, and unites with the fact of the superfluity, in leading to that which I have here drawn. I must therefore give a slight sketch of the botanical nature of fruits, though limiting myself to familiar, and nearly to domestic examples.

In the strawberry, the fruit is the receptacle; a spongy substance with an expanded surface, to which the seeds are attached superficially. Though in a very different class, and with a very different law as to the relation between the grower and the seed, it is a similar part which sustains the seed in the thistle and dandelion. The analogy of these shows that however the receptacle was necessary to the strawberry, it need not have become a fruit. The dry receptacle of the thistle is equally efficacious to the support and protection of the seeds. The pine-apple may be associated with this, if not with botanical accuracy. Here, a whole plant has been occupied in producing a single fruit, almost as large as itself; while it is an entire superfluity, and also a very operose arrangement, compared to the fruit of the strawberry. And as if it had been foreseen that the use of the fruit would destroy the seed, in both, each plant has been enabled to continue itself by voluntary offsets, and the latter, further, by that obstinately vital production, the crown, which the consumer of the fruit would be troubled to destroy, as its offensive nature makes him gladly throw it away.

The Acinus of botanists constitutes the basis of another class of fruits, and the raspberry is a familiar example. In this case there are more seeds than one connected with the superfluous structure which constitutes the fruit; while the smallness of the receptacles for the juice serves the same purposes as the bottles in the orange. And as there are dry acini, just as there are dry receptacles in some plants, of which the American raspberry is a familiar example, the conclusion is the same in both cases. If the instance here selected is an example of a perishable fruit, the acini in the pomegranate are protected by a covering of great strength, conferring a power of preservation and transportation, even greater than that allotted to the orange.

The berries form a far larger and much more variou s class of fruits. It is here equally easy to convince ourselves that the fruit is a pure superfluity.

The number of dry, or insipid, or disagreeable berries, is far greater than that of the others, while the uses to the seeds are equally served, whether the object of these be simply perpetuation, or use to animals; and in these there are more contrivances than one, for effecting that which is attained through the division of the juice in the orange and in the raspberry. There is also a distinct mechanical separation, not only tending to prevent fermentation, but to confer firmness on the fluid. In others, that structure is so minute that it is not easily detected: consisting of a delicate cellular organization, resembling that of the vitreous humour of the eye, and equally giving to the watery fluid the aspect of a jelly or a mucilage. And in other instances again, there is a gelatinous or mucilaginous substance united to the acid juice; which, by preventing the intestine motions of the fluids, equally checks fermentation, as it also aids in producing that necessary solidity, which the protecting investiture alone would not have accomplished.

The grape, the gooseberry, and the currant, are instances under this head, which I need scarcely extend: but it is interesting to remark that where the berry is small, as in the red currant for example, these provisions for solidity and against fermentation, are nearly or comparatively dispensed with; just as they are in the acini, and in the orange, where there is little mucilage, and no cellular structure. And if the intention of these several inventions is thus proved, thus also do we discover, as in endless other instances, that creation does not indulge in useless superfluities, and that the same end is obtained through variety of contrivance.

[Macculloch's *Proofs and Illustrations of the Attributes of God.*]

ON ECHOES.

There is, perhaps, not one of our readers but who has, at some period of his life, been charmed with the fascinating and often surprising effects of Echoes. The boy who shouts when passing opposite to any of the crescents or polygons forming some of the inhabited streets of London; the surprise experienced by the visitor to the Whispering gallery at St. Paul's; the augmentation of sound produced by playing a musical instrument in a vaulted apartment; and the excited attention which a reader pays to the recitals of travellers, respecting the reverberation of the voice in the Hindoo caves near Bombay; in the central mausoleum of the Egyptian pyramids; and in other similar excavations, all show that echo is one of those occurrences which must not be omitted in enumerating the pleasant associations which smooth our path through life. A brief account of the origin and nature of Echoes may perhaps not be unacceptable to many of our readers.

Before the introduction of the Christian religion, and when the minds of men, having no definite ideas of a Deity to rest upon, were wont to ascribe immortal attributes to those powers or occurrences which they could not understand, echo was believed to be the voice of an invisible nymph, who, having pined for love, frequented lonely places, and repeated the name of her lover. There was something beautiful in the idea, but, like most of the poetic imaginings of the ancient Greeks, it possessed the worst of all faults, *i. e., it was not true!* By degrees more just notions of the cause of echo, as well as of most other natural occurrences, gained ground; and for many ages men have been well assured, that echo is nothing more than the reflection of sound from a solid surface.

Most of our readers are aware, that there is no such thing in nature as absolute space, that is, space quite unoccupied by matter of some kind or other. A vessel of any kind, which, in common every-day language, is said to be empty, is, as our readers know, full of atmospheric air. Now this may, by means of the air-pump, be almost wholly removed. The space enclosed by this vessel is now called *a vacuum*, but not correctly so, since the air-pump cannot remove all the air: and it is probable that in nature there is no such thing as a vacuum, or absolutely empty space. When, therefore, we blow into a flute, or through a trumpet, we disturb the air which exists in the cavities of those instruments; and when the effect of that blast has reached the further end of the tube, we are justified in asking, "what becomes of that disturbance, and how is it that the effect thereof reaches the ears of the player and of others near him?" The answer is, that if the room in which the player were situated contained no air, no sound whatever would be heard; he might blow until he were exhausted, but he would hear no effect from it, —all would be dead silence; but, when the room is (as it invariably is) filled with air, the particles of air nearest to the instrument become agitated by the blast through the tube; they disturb the particles next to them, these latter convey that disturbance to others still further remote, &c., until, at length, every portion of air in the room, however large it may be, becomes agitated: the next step is, that the particles which happen to be nearest to the ear of any person in the room, impart their trembling motion to a sort of drum, situated in the cavity of the ear, about an inch from the surface, and called the tympanum* of the ear.

What we have said of the effect produced by blowing into a flute or trumpet, is equally true if the disturbance be brought about by any other means. If we sing, talk, cough, touch the string of a guitar or harp, draw a bow across a violin-string, clash a pair of cymbals together, vibrate the strings of a pianoforte by pressing down the keys, strike an anvil with a hammer, draw the teeth of a saw across a piece of wood, or those of a file across a piece of metal, or produce a vibratory motion of any kind in a substance surrounded with air, that vibration and disturbance will be imparted to the air, and from it to the tympanum of the ear, and then we say we hear the sound of the cymbals, violin, &c., for it must be understood that each sort of sound has the property of affecting or agitating the air in a manner peculiar to itself.

Knowing now that we should be incapable of hearing, were it not that air exists between the sounding body and our ears, we may naturally ask, "Do we hear a sound as soon as it is produced, or does it occupy an appreciable time in reaching the ear?" Any one who has seen a gun fired, or who has seen a flash of lightning, can answer this question; the spark is emitted from the flint at the same time that the discharge of the gunpowder (which produces the report,) takes place, and yet a spectator some hundred yards distant sees the spark before he hears the sound. Again, the rapid passage of electricity through the atmosphere produces light, and the consequent disturbance of the particles of air produce sound at the same instant, and yet we see the lightning before we hear the thunder. This must show us at once that sound travels more slowly than light. For all common calculation the passage of light may be considered instantaneous, inasmuch as it moves with a velocity of about 200,000 miles in a second, (that is, equal to eight times the distance from England to the

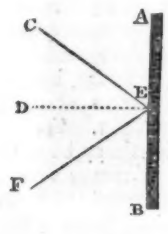
* Tympanum is the Latin word for drum.

East Indies and back again, between two ticks of the pendulum of a clock). We shall, therefore, be not far in error in saying, that we see the flash of a gun the instant it is produced.

Now it has been ascertained, that when a cannon was fired on one hill, the observers on another hill heard the report four seconds after the flash appeared; and, on measuring the distance, the hills were found to be 1500 yards from each other. The sound, therefore, took four seconds to travel 1500 yards, which makes 375 yards, or 1125 feet, per second, that is about three times the height of St. Paul's. The writer of this article has frequently heard the drum, which forms part of the military band on duty in St. James's Park every morning, at a distance of two miles from that spot; the sound, therefore, was heard about nine and a half seconds after it was produced, and all the air between those two stations was agitated by that sound.

These are instances in which there is nothing to stop or impede the progress of the sound; but, suppose a person to be standing in front of a high wall or smooth rock (for smooth surfaces reflect sounds much better than rough ones), and to shout, or to produce a loud sound by any other means, he would, by so doing, agitate the air near him, and that agitation would spread itself further and further until it reached the wall, where it would meet with a solid obstacle to stop its further progress. Now it might be supposed that the agitation or vibration of the air would terminate here, but it is not so; it immediately begins to travel backwards in the direction in which it came, and would strike upon the ear of the person who uttered the sound, as if the sound itself came from the wall instead of from his own voice. This backward travelling of the sound is called *an echo*, and however various may be the circumstances under which an echo is produced, we may always be sure that there is a surface which reflects or drives back the sound which is produced. Some surfaces do so better than others. The perfection of this reflection depends often upon the form of the reflecting surface. A convex surface is a bad reflector, a flat one is a good reflector, but a concave surface is best of all. The surface of water and even clouds sometimes act as reflectors of sound.

But now we have to inquire, whether, if two persons be placed in front of the wall, and at some distance from each other, they will both hear the echo, or if not, which of the two will hear it? This will altogether depend upon whether the surface of the wall is immediately fronting the observer, or whether it be in a slanting or oblique direction; if the latter be the case, the speaker will never hear the echo of his own voice. We shall be able to illustrate this by reference to a popular sport with which many of our readers are no doubt acquainted. Suppose C D and F to represent three persons playing at racket or fives, and A B to be the wall against which they strike the ball; if D wishes to strike the ball in such a direction, that it shall return back again to him to receive the second blow, he will strike it straight forward towards E, knowing from experience that if he strikes it in a sloping direction, either to the right or left, it will not rebound back to him again. If the player C wish to strike it so that the player F shall have the next opportunity, he will not send it towards A, but he will send it in an oblique direction towards E, expecting (and he will not be disappointed in his expectation), that it will rebound to the position F.



Now it did not require any mathematical reasoning to convince these players how to attain their object; they learned it by experience, by observing that unless they directed the ball towards a certain point, it would not rebound to the position which they required: and we hope to be equally able, without using scientific language, to show that echoes occur in just the same way Suppose, instead of a wall A B, that we had only a small portion of one near A, and that the person situate at C were to utter a loud sound, he would then hear the echo of his own voice, because the surface at A is just in the position to reflect the sound directly towards him, but the person at F would not hear it at all any more than he would have received the ball had it been propelled towards A. But now suppose that the surface of rock or wall is at E B instead of A, in that case the speaker at C would not hear the echo of his own voice; because, after encountering the wall, the sound would rebound towards F as the ball would have done had it been struck to the point E.

There is a scientific mode of expressing the direction in which the reflection will take place, by saying that the "angle of incidence is always equal to the angle of reflection," which in familiar language means, that however slanting the ball may approach the wall, it will rebound in an equally slanting direction. But let any two of our young readers personate the players C and F for a short time, and they will acquire a clearer notion than books can give them of the direction in which echoes are reflected.

If, instead of two fragments of wall at A and B, the whole wall were perfect, persons variously placed before the wall would each of them hear an echo from some point or other; but it must be borne in mind that each person would hear an echo from one point only. Understanding now that sound travels at the rate of 1125 feet per second, and that echo is merely the reflection of a sound from an opposing surface, we will in a future number give instances of various kinds of echoes.

VEGETATION, when assisted by human contrivances, is the best possible means of improving the air, and rendering a country fitter for the abode of mankind. Cultivation removes the corruption and decaying vegetables; and by turning them under the earth, makes them nourish the ground instead of poison the air. Many British colonies, at one time so deadly, are now healthy, not so much from the care of the new-comer, in avoiding the remote causes of disease, as from the greater number of these causes being removed by cultivation. I mean here, by *cultivation*, that treatment of the land by which it will furnish the largest possible quantity of food for man and the domestic animals he employs; wherever we find corn capable of growing, that country is, or by human labour may be made, healthy. Cultivation, likewise, always renders a country *warmer*, for a large quantity of vegetable matter is raised on a given space; and what is vegetable life but the conversion of certain gases, oxygen, hydrogen, azote, and carbonic acid into solid mater, and a change of form—an alteration from a rarer to a denser state—which must be accompanied by the extrication of heat? What is it that makes living vegetables so difficult of being frozen, compared to dead ones, but this constant formation and existence of caloric in them? As an example of the evolution of heat, by the process of vegetation, it may be mentioned, that on looking into a wood in spring, we shall find the small plants more advanced in size and strength than those of the plains.—?

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